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ABSTRACT

In December 1994, DePauw University (Greencastle, Indiana) began developing plans for creating its World Wide Web-based campus wide information system (CWIS), DePauwINFO. Thirteen team members were recruited whose interests were intentionally diverse to ensure a broad representation of the entire campus community. A project timeline was proposed that involved two key milestones: developing a prototype CWIS to show at public open houses during Alumni Weekend; and continuing development over the summer, to finish the production by the beginning of the fall semester. To aid in defining the CWIS mission, five subcommittees were formed, each responsible for a major component of the development. When finished, the prototype CWIS contained more than 100 Web documents, and it illustrated a variety of Web capabilities ranging from simple text-based pages to ones with graphics, online forms, and searchable databases. Advertising bookmarks were developed and mailed to alumni and prospective students. Information sponsors were designated and contacted; sponsors then designated information providers, who were given basic training in the technology. The startup version of the CWIS went "live" during the second week of September. The final task was to define and ongoing governance team who would maintain the CWIS. A "directions" subcommittee was formed to recommend and prioritize issues that should be addressed. Guiding a team using total quality management methods proved to be a rewarding way to complete a project. (AEF)

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Developing a CWIS -- It's not a Computing Center Project

ED 405 828

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Introduction:

Traditionally, developing and maintaining a campus wide information system (CWIS) has been the responsibility of a university's computing center. Indeed, the CWIS at many institutions began as a means for distributing very specific information relating to computing tools and services available to its more computer-savvy audience. The term "campus wide" often referred only to the fact that everyone on campus who had a computer account could access the CWIS. Then, the introduction of the World Wide Web (WWW) with its easy access to enormous amounts of information began to increase people's awareness of the possibilities of electronic information systems. Almost overnight, the audience of the traditional CWIS grew out of its campus boundaries to include off-campus visitors and became a worldwide audience including not only current students and staff, but alumni and prospective students, too. This newly expanded audience began to demand more than just information about computing resources available at their institution: They wanted to find up-to-date information about campus events, their classes and various other topics, and they also wanted to publish their own information. The CWIS essentially evolved from its simple campus-wide audience into a source of campus-wide information serving a world wide audience. It was no longer merely a way to distribute online computing help, but had become an important events calendar, educational resource, and marketing tool. The CWIS outgrew most computing centers' resources, so universities began restructuring their CWIS projects to include other members of the campus community for support.

Initial Development:

With these thoughts in mind, in December 1994 DePauw University began to develop plans for creating its WWW-based campus wide information system, DePauwINFO. Initial criteria for the CWIS deemed that it would focus on enhancing the academic environment at DePauw, while providing up-to-date postings about current events, services, and information about the University. The CWIS also should be available and easily accessible not only by all students, faculty and staff on campus, but also to alumni, prospective students and other visitors off campus. Thus, we gathered a team to begin the project. The team's two-part mission was to develop and set up the CWIS and to recommend a governance structure that would inherit the management of the system after initial start-up. We recruited thirteen team members whose interests were intentionally diverse to ensure

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a broad representation of the entire campus community. Representatives on the team included a person from development/external affairs, student affairs, the registrar's office, the libraries, admissions, computing user support and system administration, and a faculty member and a student. This broad mixture of personalities and interests, we hoped, would lead to the necessary diversity in the design of the CWIS.

We conducted team meetings and other processes in a TQM atmosphere in which we treated all participants equally and everyone was encouraged to participate freely. Early on, we created working guidelines to ensure that everyone understood and consented to the project mission. Using notions such as "it is ok to disagree," "all ideas are respected," and "all decisions are made by consensus" helped us to create an environment that proved invaluable to the success of the project. TQM methodology emphasized a common team goal and mission and cultivated an overall sense of team ownership of the project. Ultimately, it was this sense of project ownership that was the one of the most vital keys to the success of our CWIS.

After formally defining and consenting to our team's mission, we proposed a project timeline that involved two key milestones: We would develop a prototype CWIS to show at public open houses during Alumni Weekend, June 1995. Then, using the experience learned from that development process and the audience' response as a basis, we would continue development over the summer and finish the production version by September 1995. Once the CWIS was in place, we would pass on the project to an ongoing governance team of our design.

We knew that these dates were ambitious: We were expecting to finish our project in just a third of the time that we knew many other universities had spent. Nonetheless, we decided to invest a big part of our initial development time to develop policies, procedures and a clear mission of the CWIS before concentrating on physically creating it. Having a solid mission would serve as a foundation from which we could better define contents and decisions in the following months.

To aid in defining the CWIS mission, we formed five subcommittees, each responsible for a major component of the development: "Purpose and content," "users," "presentation," "hardware/software," and "team management." Each committee was to meet separately to research issues and then make recommendations to the whole team for consensus during full team meetings. We used this TQM method of doing work outside team meetings to reserve the meetings for focused decision making rather than arenas for pointless discussion. Making efficient use of our time was critical if we were going to finish the project on time.

The subcommittees were defined as follows: The "purpose and content" committee was responsible for developing the initial policies of the CWIS. It dealt with issues of copyright, security and privacy of personal information, quality of contents, and standards. The "users" committee's initial purpose was to define the audience and what kinds of information would address its needs. It also addressed issues related to who would contribute information to the CWIS and how they would maintain accurate information. The "presentation" committee was to establish guidelines for page layouts on the CWIS. A CWIS is a publication of a university and it was imperative that every screen exhibited a quality presence of our institution. This subcommittee's goal was to design standard screen layouts that would simultaneously present a quality view of DePauw and a simple, consistent user interface. The "hardware/software" team had the responsibility of recommending and

installing the server hardware and software. This team also investigated appropriate development tools and began to experiment with creating documents. Finally, "team management" was the team leader, responsible for focusing the team on its mission and goals. This committee also served as liaison between the team and the rest of campus, periodically reporting our progress to the administration and coordinating CWIS publicity.

After several months of developing policies and standards, we began to create the prototype. The purpose of the prototype was twofold: First, it would be a trial run for the procedures that we had so painstakingly put together. Second, since we were still working in a grassroots mode and were not yet officially recognized by upper administration, we hoped to use it to impress our test audience (primarily alumni, faculty and administrators) and gain their support for the CWIS.

We brainstormed an extensive list of possible contents for the prototype CWIS. Then we assigned priorities according to categories of the items and whether they were readily available in electronic format. We were searching for information that would illustrate a diverse view of the overall campus and yet could be easily transformed into the appropriate hypertext format. Once we completed the list of contents, we contacted the appropriate owners of each piece of information and asked them to submit their items. We called these persons "information providers." Also, a new member whom we designated as the "html editor" was added to the development team. This person was to be responsible for coordinating other team members in acquiring the information, translating it into WWW format, and finally placing the documents on the CWIS. Our plan was that several team members would be involved in editing and testing the hypertext documents.

Unfortunately, this plan did work out as well as we had hoped. Although various persons expressed an interest in learning how to create WWW documents and promised to assist with the prototype, only a couple of team members actually did the work. One reason for this was that most of us on the team had other work commitments that superseded the priority of the CWIS, especially those of us whose departments were directly involved with the upcoming alumni weekend events. However, the "team management" committee speculated that another factor also was involved in this situation. A few team members alluded that the computing center should be responsible for providing WWW document editing services for the University. Apparently, they agreed that individuals or departments should have control over selecting appropriate information for the CWIS, but should not be expected to deal with technical issues such as editing hypertext documents. Indeed, these ideas were not out of line from other similar database and report-generating services that the computing staff provided to some campus departments. Having non-computing staff perform this type of task was a new concept for some of our team members and it was an understandable reaction for them to stand back and let the others work on it. Realizing this, we noted that this was an important issue that we must resolve to complete the project. However, with our deadline rapidly approaching, we decided that we could resolve it later and directed our attention to finishing the prototype. In about three weeks' time, we gathered data from numerous information providers, converted it to hypertext format, and placed it on the server. When finished, our prototype CWIS contained more than one hundred WWW documents, and it illustrated a variety of WWW capabilities ranging from simple text-based pages to ones with graphics, online forms, and searchable databases.

The completion of the prototype produced several positive results. First, after working on

policies for several months and finally having created a concrete product, the team was both elated and relieved -- We had not only reached an important milestone in the project, but we had also met our first deadline. Second, the audience's reaction was overwhelmingly enthusiastic. Alumni were especially positive about having easy access to university information, and many also commented on the educational possibilities that the CWIS would provide. Finally, the university administrators who viewed the prototype also were receptive to its possibilities and pledged their willingness to support the continuance of the project, both administratively and financially. Overall, it was a significant step toward the success of the project.

On the other hand, the prototype development also exposed an interesting challenge to the team. We realized that the method used to create and update documents on the prototype was not going to work well for long term maintenance of the CWIS. It was evident that one or two persons alone simply could not maintain the contents of a full-blown CWIS. As a solution, we proposed and agreed to take the "information provider" idea a step further by encouraging persons not only to submit their information but to create and maintain their own documents, too. Each piece of information on the CWIS would have a "sponsor" who actually owned the contents and would have the responsibility for document preparation and maintenance. Each sponsor, then, would designate an information provider (IP) who would do the necessary preparation and editing of documents. We proposed that the "html editor" role would be transformed into that of an "IP coordinator." That person would be responsible for assisting information providers in maintaining their documents, coordinating WWW and html training, coordinating the installation of editing tools at their desktops, and providing other assistance as needed. The IP coordinator's goal would be to enable the information providers to edit their own documents, but not to do the editing for them.

Coming to a consensus on this decision was not an easy task for the team. Although everyone agreed that our original plan needed adjustments, not everyone was convinced that persons in other departments could maintain their own files. Some found it difficult to ignore the old paradigm of persons being dependent on the computing center. Nonetheless, of the solutions we presented, this method appeared to be the most viable and the team consented to try it. As a compromise, we agreed to first test the procedures internally by using team members as the first new information sponsors before we collected other persons from campus. That way, we could work out the flaws in the plan using participants who would be more willing to experiment with different approaches than others outside our team might be. Since the campus was represented so completely by the development team members, we could still present an initial set of contents that exhibited a full view of the university. Using this technique, we planned to develop a solid set of procedures for information sponsors that the governance team could then evaluate and determine whether to adopt or redesign.

Thus, we began the last stretch of development, anticipating several major components: We needed to develop the appropriate training and development tools to enable information providers to begin developing their WWW documents. We had to complete key policy issues relating to governance of the CWIS. We needed to determine appropriate members and gather together the ongoing governance team that would inherit the project. Finally, we needed to begin educating our audience about the forthcoming CWIS.

We developed advertising bookmarks that were mailed to alumni and prospective students in early August. Notifying the alumni, perhaps our largest category of audience, about the coming

CWIS proved to be the catalyst that marked the reality of the project completion. Throughout the project, our goal date had always been September, but officially committing ourselves to that date finalized the deadline. Bringing the team to a consensus on the decision to advertise a startup date for the CWIS before it was finished was difficult. A few members of the team were skeptical about the proposed completion date and were concerned that the University would suffer embarrassment if we did not meet the deadline. Most of the team members, however, were confident about meeting our deadline and convinced those others to follow along. The doubters may have not agreed with our decision to advertise so early, but they consented that it was a necessary choice for the team to make.

For the last time, we evaluated the list of contents and selected items for the production startup. By late July, we had formally designated and contacted information sponsors based on that list. As was our plan, most of the sponsors were development team members. Still, we found that we also had to add a few non-team persons to the list to ensure that we had a cross-campus set of initial contents, so we held a startup workshop for all of the sponsors to explain formally their responsibilities. Sponsors were advised to meet with other members of their departments to explain the mission of the CWIS. The departments were to consider our list of initial contents for their department and update it to include items that they thought were most important. Then, each sponsor was directed to designate an IP and explain that role in the project. Once the IPs were designated, they were to be given release time to experiment with browsing the WWW to gather a better understanding of their role.

Training that first set of information providers proved to be an interesting challenge. By the time we finally began to work with them, the advertisements had been distributed and the September deadline was looming near. Also, since most of them had limited experience in using the Internet for anything other than exchanging E-Mail, we were not sure how quickly they would grasp the concepts of the World Wide Web and its capabilities. Nor were we sure about what kind of training would most effectively teach them. With the assumptions that sponsors had already outlined the goals of the CWIS and that IPs had spent time browsing the WWW, we began by presenting a two-hour workshop that focussed on the basics of creating html documents. The workshop briefly described the WWW and illustrated Lynx, the text-based browser that we were using. Its emphasis, however, was on explaining a Windows-based html editor and tools for creating and testing hypertext documents. At the end of the workshop, participants were directed to a computing laboratory where they could experiment with the tools covered in the presentation. Afterwards, we told them that we would install the appropriate tools on their own desktops as soon as possible. Meanwhile, they could return to the laboratory anytime to work on their documents. We encouraged persons to work in groups, stressing the advantages of exchanging ideas and solutions with other persons.

Soon after this first workshop, we realized that we had overestimated the basic knowledge of some information providers. We had not anticipated that some of them were unfamiliar with using Microsoft Windows. Thus, before we offered the next hypertext workshop, we provided an optional Windows workshop for those persons. Also, some Macintosh users had difficulty translating the demonstrated Windows-based commands to the Macintosh environment, so we provided an additional workshop that illustrated Macintosh-based tools. Finally, not all of the sponsors had described completely the role of the information provider to their IPs before sending them for training. In an extreme case, one information provider showed up for the workshop with literally no

idea why she had been sent. Given the limited time that we had to work in, we chose to resolve this issue on an individual basis rather than adding specific training time to deal with it. We did note, though, that we could not always rely on sponsors to relay basic DePauwINFO information to their IPs and that we should build this type of information into the next series of IP training. With these issues resolved, finally, we followed up with another html workshop that dealt with more advanced hypertext techniques.

Meanwhile, our goal was to install an html editor and graphical browser at every information provider's desktop, but one main obstacle presented itself. DePauw still has several x286-based DOS-compatible computers that are incapable of running Windows-based programs. Unfortunately, all of the WWW tools that we were using required Windows to run. With this round of IPs, compromises were made and we were able to find appropriate solutions for everyone. However, we knew that this problem would appear again as new IPs were designated and that we would need to find ways to resolve it in the future.

While we were training the information providers, a subcommittee was working to finalize policies and procedures. From our experiences throughout the project, we realized that we could only speculate about what types of policies would be most important in the months following startup. We agreed that the formal policies we developed should serve only as an initial set of guidelines for the ongoing governance team. That committee should periodically review the CWIS policies and procedures and amend them as necessary to suit the needs of the project. The key recommendations that we passed on to the governance team were as follows: We proposed a moratorium against adding new information sponsors for several months. The existing set of IPs would be free to add and update their documents, but new sponsors would not be initiated until the committee had time to develop stable training procedures and resolve critical equipment issues. We suggested that personal student homepages would not be allowed on the CWIS until the University had investigated the legal issues involved with them. And, once the team was prepared for the next IPs, we recommended that it especially target academic departments and student life representatives, as those were areas most lacking contents on the CWIS. The governance team could choose to accept or readdress these recommendations as they saw fit, but these were the most important concerns that we noted at the time.

Finally, we completed the startup version of our CWIS and it went "live" during the second week of September. Thanks to the gritty efforts of the newly-trained information providers, we not only finished on time, but we beat the deadline by nearly two weeks. As was our goal, the CWIS contained information from all parts of campus and none of the documents had been edited by the computing center. Those areas that we were unable to fill, primarily because the appropriate persons had been unavailable during the summer months, were alluded to by place marks in the pages -- nonactive hyperlinks to information that would be added in the future. Those of us on the development team firmly believed that we had fulfilled our mission by creating a truly "campus wide" information system.

Ongoing Development and Maintenance:

Before disbanding, our final task was to define and gather an ongoing governance team who would take over the CWIS. This committee would be responsible for maintaining the project by

developing and enforcing policies and procedures, ensuring that the CWIS was meeting its original mission and vision, and encouraging its future growth. We presented and gained approval from the university president for our recommendations of the team membership and reporting structure. We proposed that this team would report to the provost and, like the development team, would consist of a diverse group representing all facets of the University. Membership included fourteen persons selected as follows: four appointments by the provost, including a representative from the registrar's office and one from the University libraries, three faculty members chosen by the faculty, one appointment by the vice president for development and alumni affairs, the director of academic computing, the information provider coordinator, the CWIS systems administrator, a representative from the office of admissions, and two students appointed by student government.

We held the first meeting of the governance team approximately two months after the CWIS had been established. We quickly learned that the new team members showed diversity in more than just their appointment areas: Although many of the members had been part of the original development team and were aware of the struggles and conflicts of developing a CWIS, the others needed to learn about the mission of the CWIS, what their responsibilities would be and how the team would function to meet its goals. At the first meeting, we spent time discussing the project and what our role in its mission would be. Similar to the development team, we agreed to hold meetings in a TQM atmosphere to build team unity, and we established guidelines to set the style for meetings. We also selected a team member to serve as the facilitator. At the end of the first meeting, a "directions" subcommittee was formed to recommend and prioritize issues that should be addressed by the governance team. Also, we formed a subcommittee composed of faculty members to develop guidelines for academic department homepages.

The "directions" group then met and identified the following key issues for maintaining and governing the CWIS: Obtaining hardware and software, ensuring accuracy and legality of information, revising policies and procedures to reflect evolution, adding and training information providers, investigating student participation, advertising, and assessing the CWIS. These recommendations were presented to the full team and other concerns were added to the list. We ranked the tasks and created four subcommittees: "hardware and software," "accuracy and legality," "outreach," and "student publications." Meanwhile, a subcommittee from the original group of IPs was creating a handbook that would assist in training new information providers. We also discussed public relations issues such as how to encourage the University community to rely on the CWIS for current campus information and we noted the need for assessment to evaluate the effectiveness of the CWIS.

We considered hardware and software to be high priority issues. Currently we were maintaining the server and all of the CWIS documents on the academic mainframe. This computer contained personal accounts for all students, faculty and selected staff, and we were concerned about performance degradation caused by heavy traffic to our CWIS. Therefore, we needed to purchase a dedicated computer for the Web site. Also, we were concerned about what type of hardware and software would be needed by our information providers to create their own hypertext documents for the CWIS. Additionally, we proposed that the governance team might advise the University about the types of hardware and software needed to support the CWIS in a networked campus. The "hardware and software" committee was assigned the responsibility of resolving these issues. The "accuracy and legality" subcommittee was directed to address issues of accuracy, legality and

avoidance of redundancy on the CWIS. It was proposed that we might establish one office or group to monitor for inaccuracies, and that we should encourage information providers to link to other information pages rather than duplicating them. The "outreach" committee was to address and resolve outreach issues such as soliciting new information providers, encouraging sponsors to keep their information current and accurate, aiding sponsors in identifying information from their area, instructing sponsors and IPs on copyright limitations, liability and slander, and training IPs to create hypertext documents. Finally, "student publications" was to resolve student involvement issues including the addition of student homepages, liability issues relating to those pages and encouragement for student groups to participate on the CWIS. Each subcommittee developed its own mission statement to keep it focused on its tasks. They have defined and prioritized the tasks necessary to complete their missions and assigned deadlines to each task.

Currently, the governance committee is involved with short term projects: the purchase of server hardware, the outreach for new information providers, and the issue of student involvement. However, we plan to resolve these issues quickly so that we can focus more on long range goals for the CWIS. The team should be more concerned with overall development of policies and procedures of the project and less involved with the day-to-day operations. Our team goal for the future is to anticipate potential stumbling blocks so that we can handle them in a proactive rather than a reactive manner. We also foresee that positions initially created to implement the production CWIS, such as the IP Coordinator, will evolve with new responsibilities to better meet the needs of the project. With the formation of an outreach subcommittee and the existence of new html software which make the creation of Web documents much easier, we may even find less need for formal training. Meanwhile, our most immediate goal for the CWIS is to establish it on campus as the definitive source of information about the University.

What We Learned:

Guiding a team using TQM methods can be a very rewarding way to complete a project. By building a sense of team unity that focuses all participants on a common goal, TQM often directs even the most diverse team members toward the successful completion of a project. Also, in our experience, the technique of employing a group of individuals with varying backgrounds to accomplish tasks results in more well rounded and better-prepared products. Nonetheless, TQM can pose challenges to teams made up of persons unaccustomed to working under its guidelines. For one, coming to a team consensus on every decision is often time-consuming and is not always a simple process. Persons who are more used to working in a democratic environment in which they decide quickly by voting are sometimes frustrated by the discussions and compromises needed to bring a team to a consensus. We also experienced a challenge in working with persons new to TQM that resulted from the makeup of the team itself. Our development team consisted of a wide range of individuals, many of whom were department directors. Those persons were not used to surrendering the "control" of handling tasks and working in an environment in which everyone was considered equal. They sometimes were uncomfortable with trusting others to accomplish tasks without their direct supervision. Hoping to avoid friction caused by these frustrations, our team leaders devoted a great deal of energy at the project startup to build TQM skills and guidelines for the team to follow. As the project progressed they had to be keenly aware of each team member's acceptance level and be prepared to resolve situations in which some found it difficult to adapt. At first, we were uncertain about whether these activities were necessary and were concerned that we had wasted valuable

project time. However, in retrospect, we firmly believe that the overall sense of project ownership and the resulting commitment of the team members, cultivated by TQM methodology, was the key factor that attributed the most to our CWIS' success.

Although we expected to encounter a few obstacles in providing necessary development tools to the information providers, we were startled by the shortage of appropriate equipment available to support those tools on our campus. We easily found Macintosh-based editing tools that would run on almost every Macintosh computer on our campus. However, we have many low-end DOS-compatible computers that are incapable of running the Windows-based editing software that we originally selected. This forced us to look into alternative, perhaps not so user-friendly, solutions for creating and testing hypertext documents on DOS computers. Unfortunately, we have found that the most sophisticated hypertext editors and browsers are available only for the Windows platform and that similar tools for the DOS-only platform are less user-friendly and provide fewer user options. For us, this presents a Catch-22 situation: The people who have a low-end DOS computers are likely to the ones who have had less opportunity to experiment with different computing tools and subsequently have less overall computing knowledge. Ironically, these persons are the ones who could benefit the most from having the sophisticated tools for maintaining their CWIS documents, yet they are the most difficult to sufficiently equip. We are currently investigating alternative solutions for those information providers, such as providing hypertext tools in the public computing laboratories or recommending to the administration that IPs should be high on the list of persons who receive updated equipment. So far, though, we have not completely resolved this situation at our university, largely because decisions made about equipment purchase often depend more on the university budget than on user needs.

Initially, to ensure that the topics presented would represent a broad range of campus information, we identified a contents list and highlighted items as key content documents for our startup CWIS. Still, when we introduced our CWIS, we found some obvious omissions of information about certain areas of the university, namely, student affairs, the school of music and student life. Additionally, after we had identified contents and began to determine the appropriate owner for each piece, we discovered that it was not always clear who owned the information. For example, we were told that one department was recognized as the official source of the University calendar, yet we found two other areas who also kept events calendars that they believed were more complete. In hindsight, we realize that we may have concentrated too much on identifying specific information for the CWIS. Instead, we might have gained more positive results by identifying university departments that should be represented and encouraging them to identify the specific contents themselves.

Looking to the future, at some point we will need to address the issue of measurement: Are we still focused on our original mission? What are our customer service goals and how will we know that we have achieved them? We may want to create an online visitors' survey to check if our off-campus users are finding useful information. We will also need to survey our students, faculty and staff to find out if they use the CWIS to find useful campus information and ask them what type of information they want to see on our Web site. We will need to track things such as the number of admissions inquiries that are received via the CWIS or how many "hits" we receive on our welcome page and other key homepages. The only way to ensure that we have created a successful product that is useful to our audience is to continually ask, "How can we improve?"

Finally, through the experience of this project, we are firmly convinced that developing and maintaining a CWIS is not a computing center project. Certainly, the computing center plays a critical role by supporting the technology of the CWIS, maintaining the server hardware and software, investigating updated client programs and development tools, and providing support and training for the information providers. However, without intending to downplay the importance of that support, technical support is merely a small portion of the diverse range of services necessary to maintain the system. A good CWIS requires that all areas of campus are equally represented and supported by its contents and services. Ensuring that goal requires that a diverse group of individuals from all parts of the institution be responsible for the key decision making that drives the CWIS.